

IN THE CLAIMS

Please amend claims 5, 17, 18, 26, and 27 as follows.

1 - 4. (Cancelled)

5. (Currently Amended) An image pickup device comprising:

a plurality of pixels each including a photoelectric conversion unit, a floating diffusion region to which a signal from said photoelectric conversion unit is transferred, a transfer switch to transfer the signal from said photoelectric conversion unit to said floating diffusion region, and an amplifying transistor whose gate is connected to said floating diffusion region to read out the signal from said floating diffusion region; and

~~a drive circuit coupled to said plurality of pixels to output a pulse wave form signal for controlling said transfer switch so that a time during which said transfer switch changes from an ON state to an OFF state becomes longer than a time during which said transfer switch changes from the OFF state to the ON state~~ controlling said transfer switch, wherein the drive circuit supplies said transfer switch with a signal of a first level to set said transfer switch to be in an OFF period by maintaining the signal at the first level for the OFF period, and supplies said transfer switch with a signal of a second level to set said transfer switch to be in an ON period by maintaining the signal at the second level for the ON period, such that a fall speed of changing from the second level to the first level is slower than a rise speed of changing from the first level to the second level,

wherein, during the ON state, charge is transferred from said photoelectric conversion

unit to said floating diffusion region.

6. (Cancelled)

7. (Previously Presented) The device according to Claim 5, wherein said photoelectric conversion unit includes an embedded photodiode.

8. (Previously Presented) The device according to Claim 5, further comprising
an analog/digital conversion circuit adapted to convert a signal from each of said plurality of pixels into a digital signal,

a signal processing circuit adapted to process the signal from said analog/digital conversion circuit, and

a recording circuit adapted to record the signal processed by said signal processing circuit.

9. (Withdrawn) An image pickup device comprising:

a plurality of pixels each including a photoelectric conversion unit, a semiconductor area to which a signal from said photoelectric conversion unit is transferred, a transfer switch adapted to transfer the signal from said photoelectric conversion unit to said semiconductor area, and a read unit adapted to read out the signal from said semiconductor area; and

a drive circuit adapted to control said transfer switch,

wherein a substantial driving force of said drive circuit for changing said transfer switch from an OFF state to an ON state is higher than a substantial driving force for changing said transfer switch from the ON state to the OFF state.

10. (Withdrawn) A device according to Claim 9, wherein said read unit includes an amplification transistor for amplifying and outputting the signal in said semiconductor area.

11. (Withdrawn) A device according to Claim 9, wherein said photoelectric conversion unit includes an embedded photodiode.

12. (Withdrawn) A device according to Claim 9, further comprising
an analog/digital conversion circuit adapted to convert a signal from each of said plurality of pixels into a digital signal,

a signal processing circuit adapted to process the signal from said analog/digital conversion circuit, and

a recording circuit adapted to record the signal processed by said signal processing circuit.

13. (Withdrawn) An image pickup device comprising:

a plurality of pixels each including a photoelectric conversion unit, a semiconductor area

to which a signal from said photoelectric conversion unit is transferred, a transfer switch adapted to transfer the signal from said photoelectric conversion unit to said semiconductor area, and a read unit adapted to read out the signal from said semiconductor area; and

a drive circuit adapted to control said transfer switch,

wherein said transfer switch comprises a transistor of a first conductivity type, and said drive circuit includes at least a structure formed by connecting the transistors of the first conductivity type in series.

14. (Withdrawn) A device according to Claim 13, wherein said read unit includes an amplification transistor for amplifying and outputting the signal in said semiconductor area.

15. (Withdrawn) A device according to Claim 13, wherein said photoelectric conversion unit includes an embedded photodiode.

16. (Withdrawn) A device according to Claim 13, further comprising
an analog/digital conversion circuit adapted to convert a signal from each of said plurality of pixels into a digital signal,

a signal processing circuit adapted to process the signal from said analog/digital conversion circuit, and

a recording circuit adapted to record the signal processed by said signal processing circuit.

17. (Currently Amended) An image pickup device comprising:

a plurality of pixels each including a photoelectric conversion unit, a ~~semiconductor area~~ floating diffusion region to which a signal from said photoelectric conversion unit is transferred, a transfer switch to transfer the signal from said photoelectric conversion unit to said ~~semiconductor area~~ floating diffusion region, and a read unit to read out the signal from said ~~semiconductor area~~ an amplifying transistor whose gate is connected to said floating diffusion region; and

a drive circuit coupled to said plurality of pixels to output a signal to control said transfer switch so that a fall speed V_{off} for changing said transfer switch from an ON state to an OFF state has a relation $10 \text{ V}/\mu\text{sec} > V_{off}$ controlling said transfer switch, wherein the drive circuit supplies said transfer switch with a signal of a first level to set said transfer switch to be in an OFF period by maintaining the signal at the first level for the OFF period, and supplies said transfer switch with a signal of a second level to set said transfer switch to be in an ON period by maintaining the signal at the second level for the ON period, such that a fall speed of changing from the second level to the first level is slower than $10 \text{ V}/\mu\text{sec}$.

18. (Currently Amended) The device according to Claim 17, wherein said ~~read unit~~ includes an amplification transistor for amplifying and outputting amplifies and outputs the signal in said ~~semiconductor area~~ floating diffusion region.

19. (Previously Presented) The device according to Claim 17, wherein said photoelectric conversion unit includes an embedded photodiode.

20. (Previously Presented) The device according to Claim 17, further comprising
an analog/digital conversion circuit adapted to convert a signal from each of said plurality of pixels into a digital signal,

a signal processing circuit adapted to process the signal from said analog/digital conversion circuit, and

a recording circuit adapted to record the signal processed by said signal processing circuit.

21. (Withdrawn) An image pickup device comprising:

a plurality of pixels each including a photoelectric conversion unit, a semiconductor area to which a signal from said photoelectric conversion unit is transferred, a transfer switch adapted to transfer the signal from said photoelectric conversion unit to said semiconductor area, and a read unit adapted to read out the signal from said semiconductor area; and

a drive circuit adapted to control said transfer switch,

wherein said drive circuit includes a constant current circuit.

22. (Withdrawn) A device according to Claim 21, wherein said read unit includes an amplification transistor for amplifying and outputting the signal in said semiconductor area.

23. (Withdrawn) A device according to Claim 21, wherein said photoelectric conversion unit includes an embedded photodiode.

24. (Withdrawn) A device according to Claim 21, further comprising
an analog/digital conversion circuit adapted to convert a signal from each of said plurality of pixels into a digital signal,
a signal processing circuit adapted to process the signal from said analog/digital conversion circuit, and
a recording circuit adapted to record the signal processed by said signal processing circuit.

25. (Cancelled)

26. (Currently Amended) A drive method for an image pickup device including comprising a plurality of pixels each including a photoelectric conversion unit, a floating diffusion region to which a signal from said photoelectric conversion unit is transferred, a transfer switch to transfer the signal from said photoelectric conversion unit to said floating diffusion region, and an amplifying transistor whose gate is connected to said floating diffusion region to read out the signal from said floating diffusion region, the method comprising:
~~an output step of outputting a pulse wave form signal to control said transfer switch so that a time during which said transfer switch changes from an ON state to an OFF state becomes~~

longer than a time during which said transfer switch changes from the OFF state to the ON state a step of supplying said transfer switch with a signal of a first level to set said transfer switch to be in an OFF period by maintaining the signal at the first level for the OFF period, and supplying said transfer switch with a signal of a second level to set said transfer switch to be in an ON period by maintaining the signal at the second level for the ON period, such that a fall speed of changing from the second level to the first level is slower than a rise speed of changing from the first level to the second level,

wherein, during the ON state, charge is transferred from said photoelectric conversion unit to said floating diffusion region.

27. (Currently Amended) A drive method for an image pickup device including comprising a plurality of pixels each including a photoelectric conversion unit, a semiconductor area floating diffusion region to which a signal from said photoelectric conversion unit is transferred, a transfer switch to transfer the signal from said photoelectric conversion unit to said semiconductor area floating diffusion region, and a read unit to read out the signal from said semiconductor area an amplifying transistor whose gate is connected to said floating diffusion region, the method comprising:

an output step of outputting a drive signal to control said transfer switch so that a fall speed V_{off} for changing said transfer switch from an ON state to an OFF state has a relation $t_0 \propto 1/V_{off}$ a step of supplying said transfer switch with a signal of a first level to set said transfer switch to be in an OFF period by maintaining the signal at the first level for the OFF

period, and supplying said transfer switch with a signal of a second level to set said transfer switch to be in an ON period by maintaining the signal at the second level for the ON period, such that a fall speed of changing from the second level to the first level is slower than $10 \text{ V}/\mu\text{sec}$.

28. (Cancelled)